Preventing Corrosion

Jun 7, 2011

There are several different methods that can be used to prevent corrosion from taking place. These methods include barrier methods, corrosion resistant metals, and cathodic protection.

Barrier Methods

Barrier methods coat the object to be protected usually with paint or oil/grease. Barriers prevent corrosion

by preventing oxygen and water from contacting the metal surface. These methods are relatively cheap but the protective barrier can scratched or worn off.

Corrosion Resistant Metals

Alloys of steel can be manufactured that will resist the normal corrosion processes. These alloys contain other elements such as cobalt,

vanadium, and chromium. These alloys are more expensive than ordinary steels, limiting their use.

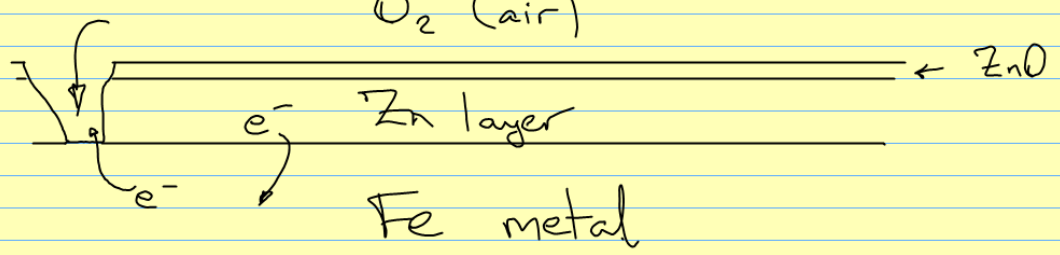
An alternative to steel alloys is to use a metal that resists corrosion such as aluminum. Although lighter than steel it is not a strong, limiting its application. Titanium does not corrode either, but while it is stronger than steel it is much more expensive.

Cathodic Protection

For oxidation to occur in a metal it must form the anode of the electrolytic cell. By forcing an object to be the cathode of the cell it is protected from corrosion. This method of protection is known as cathodic protection. Two methods of cathodic protection are sacrificial anodes and impressed current.

Sacrificial Anodes

A sacrificial anode is a more reactive metal that is attached to the object being protected. Galvanized steel is an example of a sacrificial anode.



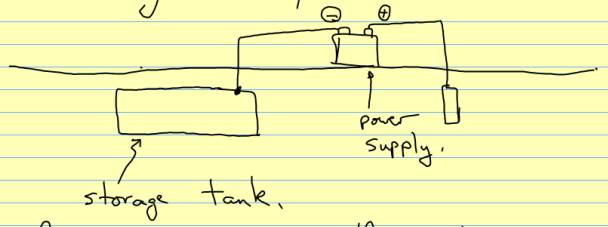
When the zinc layer on the galvanized

steel is scratched, oxygen can begin to react with the iron metal. As the iron oxidizes the zinc loses electrons to the iron and oxidizes instead.

The advantage of a sacrificial anode is that it is passive and provides continuous protection until the anode is consumed. The disadvantage is that the anode must occassionally be replaced.

Impressed Current

This method of cathodic protection uses a power supply to protect the metal object from corrosion.



As the iron in the storage tank tries to oxidize, the power source replaces the electrons. This prevents the oxidation from occuring and protects the storage tank. This method works so long as the power source is operating.

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